

AMENDMENT UNDER 37 C.F.R. § 1.116
U.S. Appln. No. 09/974,048

REMARKS

Claims 1 and 3-9 are all the claims pending in the application. By way of this amendment, Applicants incorporate claim 2 into claim 1, and cancel claim 2 accordingly.

Claims 1 and 4-8 are rejected under 35 U.S.C. § 103(a) as being unpatentable over newly cited Omote et al. (5,858,518) in view of Hashimoto (6,224,569).

Claims 2, 3 and 9 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Omote et al. (5,858,518) in view of Hashimoto et al. (6,225,569) and Lubrano et al. (4,798,733).

Analysis

Claims 1 and 5 are the only claims in independent form; therefore, the following discussion is initially directed to these independent claims.

Claim 1 is directed to a circuit board that includes a terminal portion connected to an external terminal. The terminal portion has a nickel plating layer, a soldering bump, a base layer and a conductive layer. The nickel plating layer is 1-4 μm thick. The base layer includes polyimide resin.

Omote is directed to a circuit substrate. The Examiner asserts that Omote discloses all the features of claim 1, except for the solder bump.

To supplement this deficiency, the Examiner turns to Hashimoto, and argues that it would have been obvious to provide a solder bump in Omote "in order to provide an electrical connection between two circuit boards."

Although solder bumps has been generally known, there is no motivation for providing a solder bump to the substrate in Omote. Omote discloses the use of terminals 5, 6. Thus, Omote

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already employs a terminal and there would be no reason one would have added a solder bump to the terminal.

Hashimoto does not provide any motivation for such a modification either. Hashimoto discloses a solder bump, but there is no reason for providing the solder bump on the Omote device. The mere fact that references can be combined, is not sufficient motivation for supporting an obviousness rejection. Without a suggestion or motivation, which is lacking in the combination of these two references, claim 1 would not be obvious.

Still further, Applicants amend claim 1 to emphasize that the material composition of the solder which ensures a connection reliability for a long term, even under high temperature and humidity. (See page 10 of the pending specification.)

Such a material composition is not taught by Omote and Hashimoto. Moreover, it would not have been obvious to use such a composition for a solder bump in Omote in view of Lubrano. Lubrano is merely directed to soldering pieces together, such as in plumbing (see Abstract and col. 1). In particular, the conventional use of lead had been recently restricted, and thus, Lubrano is directed to provided a solder which is as workable as the previous lead solders. There is no reason one of ordinary skill in the art would have turned to a plumbing solder for use in an electrical circuit board in which electrical connectivity is a primary consideration.

In view of the foregoing, claim 1 is patentable.

With respect to claim 5, Applicants respectfully submit that there is no motivation for modifying Omote to use a solder bump, as mentioned above. Although Hashimoto discloses a solder bump, there is no problem to be solved in Omote, or motivation in Hashimoto, that would have led one of ordinary skill in the art to make this modification to Omote.

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In view of the foregoing, claim 5 is patentable.

The remaining rejections are directed to the dependent claims. These claims are patentable for at least the same reasons as claims 1 and 5, by virtue of their dependency therefrom.

Moreover, Omote fails to disclose that the cover layer should be .5- 8.0 μ m thick. Thus, claim 8 should be patentable for this additional reason.

Conclusion

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

Respectfully submitted,



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